# Student Training Manual for

CONTROL DATA

## MSL 150 / CMSE OPERATIONS

An Individualized Course

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# INTRODUCTION

The Maintenance Software Library (MSL) 150 is a set of test, diagnostic, and utility programs for CDC CYBER 170 Models 815 through 855. The programs in MSL 150 perform testing of system components, isolation of malfunctions, and monitoring of machine states. MSL 150 is divided into the following parts.

- Common test and initialization (CTI) programs
- Common maintenance software executive (CMSE) programs
- Command buffers
- Utility routines
- Interface routines
- Tests and diagnostics

In this course, you will learn how to deadstart MSL 150 on a Series 800 system, load and run CMSE, create and modify command buffers, and execute utility routines.

This course is an individualized, self-study package allowing you to learn at your own pace.

If this is your first experience with PLATO assisted learning (PAL), you may want to read through appendix A, Using Individualized Instruction, before you actually sign on to the terminal. This appendix explains the basic philosophy and organization of self-study courses. Appendix B also explains the correct procedure for shigning on to the PLATO terminal. If you have had no previous experience with microfiche, read appendix C.

You may now begin the course by starting module 1.

# MODULE 1
# MSL 150 DEADSTART AND INITIALIZATION

This module introduces MSL 150/CMSE, shows you how to deadstart the system, presents the MSL 150 and CMSE displays, allows you to change system configuration, and shows the uses of special console keys.

Throughout this course, you will be asked to read portions of the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530. Please ensure that you have this manual available before starting this module.

## PRETEST

To start this module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLATO Learning Management (PLM) will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 1-A | Text Reading: MSL 150/CMSE Introduction. This activity covers hardware requirements, software restrictions, and terminology for MSL 150 and CMSE. | 1-3 |
| _____ | _____ | 1-B | Reference Reading: Deadstart. This activity describes the programs for deadstarting from tape and disk. | 1-6 |

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 1-C | PLATO Lesson: Deadstart. This lesson gives you practice in generating a deadstart program, and describes how to enter the program into the deadstart panel switches or micro-processor. | 1-7 |
| _____ | _____ | 1-D | PLATO Lesson: CMSE Loading and Initial Displays. This lesson shows you how to load CMSE, how to interpret screen leader information, and the use of the special keys on the CC545 system console. | 1-8 |
| _____ | _____ | 1-E | PLATO Lesson: CMSE Displays. This lesson presents all the CMSE displays, and gives you practice entering CMSE commands to select any display. | 1-9 |

## LEARNING ACTIVITY 1-A. TEXT READING: MSL 150/CMSE INTRODUCTION

This activity introduces MSL 150/CMSE.

### OBJECTIVE

- You will be able to define the terms MSL, CTI, CMSE, DEMOT, Command Buffer and RTD.

### MAINTENANCE SOFTWARE LIBRARY (MSL 150)

The maintenance software library (MSL 150) is a set of tests, diagnostics and utilities, plus the common test and initialization (CTI) programs and the common maintenance software executive (CMSE) programs.

The tests and diagnostics may be either model independent, executing on any Series 800 mainframe, or model dependent, executing on only one system type.

Appendix E of the MSL 150 Reference Manual, publication number 60456530, lists all programs included in the MSL 150 library, and indicates the Series 800 model, or models, to which each program applies.

In this course, we will cover operating procedures for the programs listed under CTI, CMSE, utilities, and DEMOT. These programs are all model independent, and execute on Series 800 Models 815 through 855.

### COMMON TEST AND INITIALIZATION (CTI)

CTI performs hardware initialization. It presents a standardized set of displays and accepts a standard group of commands to simplify the deadstart process for both the customer engineer and the system operator. CTI also includes some input/output unit (IOU) testing and hardware initialization functions.

You will practice using CTI to deadstart the system in future learning activities.

MSL 150 CMSE Operation
Learning Activity 1-A

## COMMON MAINTENANCE SOFTWARE EXECUTIVE (CMSE)

CMSE provides off-line monitor capabilities for the computer system. This means CMSE monitors system hardware, loads, and initiates execution of maintenance software and utility programs, and loads and initiates execution of CPU microcode.

CMSE uses a set of commands which allow the operator to perform many functions including the following:

- Display and alter data in mainframe registers and memories.
- Transfer data between two memory locations.
- Add programs to the maintenance software library (MSL) device.
- Load programs from MSL device to PP or central memory.
- Load CPU microcode.
- Display, create, and execute command buffers.

You will learn to use all the CMSE commands in future learning activities of this course.

## COMMAND BUFFERS

A command buffer is a series of keyboard (CMSE and program) commands residing on the MSL disk that are executed as a group by CMSE. Each command buffer is assigned a unique name to identify it on the disk. Command buffers may be read in from a card reader or input interactively from a terminal. You will learn how to create and execute command buffers in this course.

## UTILITY ROUTINES

The utility routines provide features not available in standard tests. Two types of utilities exist in the MSL; those that are part of CMSE, which are usually overlays and are executed by a CMSE command, and stand-alone utilities, which may require a supporting system to perform their function.

You will learn how to execute the MSL utility programs in future learning activities.

## DIAGNOSTIC EXECUTIVE MONITOR FOR OFF-LINE TESTING (DEMOT)

DEMOT is an off-line executive monitor system that is used to control programs that test peripheral devices. DEMOT runs under user control with CMSE. You will have an opportunity to simulate DEMOT execution later in this course.

## REMOTE TERMINAL DRIVER (RTD)

RTD is a utility program which executes under control of CMSE to provide an interface between CMSE and a customer engineer (CE) positioned at a remote terminal located away from the central computer site. RTD can be loaded, its parameters set, and execution started by the on-site CE just like any other nonstand-alone MSL program. Once the CE at a remote terminal has logged into RTD, the remote CE can enter CMSE commands to load programs, set parameters, and run tests and diagnostics in the MSL. RTD thus converts the remote terminal into a maintenance console. You will learn how to load and execute RTD later in this course.

## TESTS AND DIAGNOSTICS

As we mentioned earlier, the MSL 150 library contains a set of tests that check the hardware for correct operation as well as diagnostics that isolate system faults. The MSL library is used as a source library for creating MSL binary tapes for each computer system model. The MSL 152 tape, for example, is applicable to the CYBER 170 Model 835, and the MSL 151 tape is applicable to the Model 825. A list of tests and diagnostics available on each MSL binary tape is provided in appendix E of the MSL 150 reference manual. Tests and diagnostics are covered in other, model dependent courses.

This learning activity has defined many terms commonly used when discussing MSL 150, and identified major topics that will be covered in this course. If you have any questions, you may review the text before going on to the next activity.

## LEARNING ACTIVITY 1-B. REFERENCE READING: DEADSTART

This activity describes the programs for deadstarting a Series 800 system and the common test and initialization (CTI) package.

OBJECTIVES

- You will be able to deadstart a Series 800 Model 815 or 825 system, and Model 835 or 855 system using both warmstart and coldstart procedures.
- You will be able to define the purpose of the CTI package as found on MSL and OS deadstart tapes, and to identify the purpose of the following CTI displays: A, O, U, and M.

The MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530 contains detailed descriptions of the deadstart procedures, and of CTI displays and options.

Read the information, on the pages listed, in the following sequence.


| Title | Page |
|---|---|
| Deadstart/Initialization Procedures | 2-1 |
| Common Test and Initialization (CTI) | 2-1 |
| Deadstart Procedures | 2-1 |
| Warmstart Procedure (Model 825) | 2-2 |
| Warmstart Procedure (Models 835 and 855) | 2-3 |
| Deadstart Panel | 2-4 |
| Warmstart Program | 2-5 |
| Coldstart Procedure (Model 825) | 2-7 |
| Coldstart Procedure (Models 835 and 855) | 2-8 |
| Coldstart Programs | 2-9 |
| Coldstart Decks | 2-10 |
| Selecting Deadstart Options (*A* Display) | 2-11 |
| Off-Line Maintenance (M) | 2-24 |


When you have finished these readings, you may go on to the next assigned activity.

## LEARNING ACTIVITY 1-C. PLATO LESSON: DEADSTART

This activity gives you practice in generating a deadstart program, and describes how to enter the program into the Model 835/855 deadstart panel switches, and into the Model 815/825 Microprocessor.

OBJECTIVES

- You will be able to deadstart a Series 800 Model 815 or 825 system, and a Model 835 or 855 system using both warmstart and coldstart procedures.
- You will be able to define the purpose of the CTI package as found on MSL and OS deadstart tapes, and to identify the purpose of the following CTI displays: A, O, U, and M.

To complete this activity, sign on to the PLATO terminal, and go to the assignment page for learning activity 1-C. Take the PLATO lesson as directed.

## LEARNING ACTIVITY 1-D. PLATO LESSON: CMSE LOADING AND INITIAL DISPLAYS

During this activity, you learn how to load CMSE, how to interpret the information in the screen header lines, and the purpose of the special keys on the CC545 system console.

OBJECTIVE

- You will be able to load CMSE, define each indicator on the left and right screens, and state the purpose of each of the special keys on the CC545 system console.

To complete this activity, sign on to the PLATO terminal, and go to the assignment page for learning activity 1-D. Take the PLATO lesson as directed.

## LEARNING ACTIVITY 1-E. PLATO LESSON: CMSE DISPLAYS

This lesson presents all of the CMSE displays, describes each display, and allows you to practice entering CMSE commands to select any of the displays.

OBJECTIVE

- You will be able to enter the command to select any CMSE display, and to state the purpose of each display.

To complete this activity, sign on to the PLATO terminal, and go to the assignment page for learning activity 1-E. Take the PLATO lesson as directed.

## POST TEST

When you have completed the learning activities assigned for module 1, sign on to the PLATO terminal and take the module 1 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

Depending on the results of this test, you will be told either to review some of the activities in this module or to go on to module 2.

# MODULE 2
# CMSE COMMANDS-1

In this module, you will learn the CMSE, CM, and PP commands in MSL 150.

## PRETEST

To start this module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLATO Learning Management (PLM) will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 2-A | Reference Reading: CM Commands. This activity describes CMSE commands for entering data and programs into CM, altering CM data, and writing a CM program to the MSL disk. | 2-3 |
| _____ | _____ | 2-B | Reference Reading: PP Commands. This activity describes CMSE commands for entering data and programs into PP memory, altering PP memory, and writing a PP program to the MSL disk. | 2-4 |
| _____ | _____ | 2-C | PLATO Lesson: CM/PP Commands. This lesson gives you practice using CM and PP commands. | 2-5 |

## LEARNING ACTIVITY 2-A. REFERENCE READING: CM COMMANDS

This activity describes the CMSE commands which affect data and programs in CM.

OBJECTIVE

- You will be able to use CMSE commands to enter and modify data in central memory, load programs into CM, and write a CM program to the MSL disk.

Read the following information in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530:


| Title | Page |
|---|---|
| Central Memory Commands | 3-23 |
| Enter Byte of CM Data (EB) | 3-32 |
| Enter Word of CM Data (EC) | 3-32 |
| Set/Clear Block of CM (KC) | 3-33 |
| Move Central Memory (MC) | 3-33 |
| Set A Register (XA) | 3-34 |
| Set B Register (XB) | 3-34 |
| Set P Register (XP) | 3-34 |
| Load CM Program from MSL Device (CC) | 3-35 |
| Load CM Program from MSL Device and Verify (VC) | 3-35 |
| Load Binary Cards to CM (LC) | 3-36 |
| Monitor CM for CMSE Calls (CN) | 3-36 |
| Stop Monitoring CM for CMSE Calls (CF) | 3-36 |
| Compare Hexadecimal Data in CM (CH) | 3-37 |
| Write CM Program to MSL Disk (*WC) | 3-37 |


When you have finished these readings, you may go on to the next assigned activity.

## LEARNING ACTIVITY 2-B. REFERENCE READING: PP COMMANDS

This activity describes the CMSE commands which affect data and programs in PP memory.

OBJECTIVE

- You will be able to use CMSE commands to enter and modify data in PP memory, load programs into PP memory, and write a PP program to the MSL disk.

Read the following information in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530):


| Title | Page |
|---|---|
| Peripheral Processor Commands | 3-11 |
| Change PP Display Block (DI) | 3-14 |
| Enter PP Memory (EP) | 3-16 |
| Enter PP Memory Hexadecimal Data (EH) | 3-16 |
| Clear PP Memory (KP) | 3-16 |
| Move PP Memory (MP) | 3-17 |
| Load PP Memory from MSL Device (CP) | 3-18 |
| Load PP Program from MSL Device and Verify (VP) | 3-18 |
| Load Binary Cards to PP (LP) | 3-19 |
| Call Test into PP and Use Library Overlays (LT) | 3-20 |
| Call Test into PP and Use CM Overlays (TL) | 3-20 |
| Deadstart PP (DP) | 3-21 |
| Execute PP Program (RU) | 3-21 |
| Halt PP Program Execution (HT) | 3-22 |
| Repetitive Deadstart (RP) | 3-22 |
| Write PP Program to MSL Disk (*WP) | 3-23 |
| Select Display Code Equivalents (EN) | 3-63 |
| Remove Display Code Equivalents (EF) | 3-63 |


When you have finished these readings, you may go on to the next assigned activity.

## LEARNING ACTIVITY 2-C. PLATO LESSON: CM/PP COMMANDS

During this lesson, you learn to use the CM and PP commands covered in learning activities 2-A and 2-B.

OBJECTIVES

- You will be able to use CMSE commands to enter and modify data in central memory, load programs into CM, and write a CM program to the MSL disk.
- You will be able to use CMSE commands to enter and modify data in PP memory, load programs into PP memory, and write a PP program to the MSL disk.

To complete this activity, sign on to the PLATO terminal, and go to the assignment page for learning activity 2-C. Take the PLATO lesson as directed.

## POST TEST

When you have completed the learning activities assigned for module 2, sign on to the PLATO terminal and take the module 2 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

Depending on the results of the test, you will be told either to review some of the activities in this module or to go on to module 3.

# MODULE 3
# CMSE COMMANDS-2

In this module, you will learn the remaining CMSE commands in MSL 150, including CS, MCH, utility, library, command buffer, and program control commands.

## PRETEST

To start this module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLATO Learning Management (PLM) will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 3-A | Reference Reading: CS Commands. This activity describes CMSE commands for loading control store, altering CS data, controlling CS operation, and writing the contents of CS to the MSL disk. | 3-3 |
| _____ | _____ | 3-B | Reference Reading: MCH Commands. This activity describes the CMSE commands for entering data into a maintenance register, and for master clearing and clearing errors via the maintenance channel. | 3-4 |

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 3-C | PLATO Lesson: CS/MCH Commands. During this lesson, you practice using the control store and maintenance channel commands. | 3-5 |
| _____ | _____ | 3-D | Reference Reading: Utility and Library Commands. This activity describes the CMSE commands for controlling PP, channel and card reader operation, and for adding/deleting programs to/from the MSL disk. | 3-6 |
| _____ | _____ | 3-E | Reference Reading: Command Buffer Commands. This activity describes the CMSE commands for creating, modifying, and executing command buffers, and for adding and deleting command buffers to/from the MSL disk. | 3-7 |
| _____ | _____ | 3-F | PLATO Lesson: Utility, Library, and Command Buffer Commands. This lesson gives you practice in using the CMSE utility, Library, and Command Buffer Commands. | 3-8 |
| _____ | _____ | 3-G | Reference Reading: Program Control Commands. This activity describes the CMSE commands that alter the parameter bits which control program execution. | 3-9 |

## LEARNING ACTIVITY 3-A. REFERENCE READING: CS COMMANDS

This activity describes the CMSE commands which affect control store (CS) in a Series 800 CPU.

OBJECTIVE

- You will be able to use CMSE commands to enter and modify data in control store (CS), load the microcode into CS, and write the contents of CS to disk.

Read the following information in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530:


| Title | Page |
|---|---|
| Enter Control Store (EK) | 3-41 |
| Load CS Program from MSL Device (CK) | 3-41 |
| Load CS Program from MSL Device and Verify (VK) | 3-42 |
| Halt Microcode Execution (HK) | 3-42 |
| Repetitive Deadstart Control Store (RK) | 3-42 |
| Write Control Store to MSK Disk (*WK) | 3-43 |
| Load Soft Control Memory from MSL (CS) | 3-43 |


When you have finished these readings you may go on to the next assigned activity.

## LEARNING ACTIVITY 3-B. REFERENCE READING: MCH COMMANDS

This activity describes the CMSE commands which affect the maintenance channel and maintenance registers.

OBJECTIVE

- You will be able to use CMSE commands to enter data into a maintenance register, and to master clear and clear errors via the maintenance channel.

Read the following information in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530:

| Title | Page |
|---|---|
| Enter Maintenance Register Date (ER) | 3-47 |
| Master Clear Via Maintenance Channel (CX) | 3-47 |
| Clear Error Via Maintenance Channel (CE) | 3-48 |

When you have finished these readings you may go on to the next assigned activity.

## LEARNING ACTIVITY 3-C. PLATO LESSON: CS/MCH COMMANDS

During this lesson, you learn how to use the CS and MCH commands covered in learning activities 3-A and 3-B.

OBJECTIVES

- You will be able to use CMSE commands to enter and modify data in control store, load the microcode into CS, and write the contents of CS to the MSL disk.
- You will be able to use CMSE commands to enter data into a maintenance register, and to master clear and clear errors via the maintenance channel.

To complete this activity, sign on to the PLATO terminal, and go to the assignment page for learning activity 3-C. Take the PLATO lesson as directed.

## LEARNING ACTIVITY 3-D. REFERENCE READING: UTILITY AND LIBRARY COMMANDS

During this activity, you learn the CMSE commands for controlling PP, channel, and card reader operation.

OBJECTIVE

- You will be able to state the purpose, format and use of each of the CMSE utility commands and disk library commands.

Read the following information in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530.


| Title | Page |
|---|---|
| Add Program to MSL Disk (*AP) | 3-55 |
| Delete Program From MSL Disk (*DP) | 3-55 |
| Delete Dayfile (*DP, *DF) | 3-55 |
| Enter Dayfile (ED) | 3-57 |
| Monitor Card Reader (CR) | 3-58 |
| Null Display (AN, BN) | 3-63 |
| Do Not Monitor PP (DN) | 3-63 |
| Monitor PP (UP) | 3-64 |
| Autoload Buffer Controller With Controlware from the Library Device (CW) | 3-64 |
| Clock Margins (CM) | 3-64 |
| Log Errors (LE) | 3-64 |
| Activate Channel (*AC) | 3-65 |
| Deactivate Channel (*DC) | 3-65 |
| Send Function to Channel (*FC) | 3-65 |
| Input to Pseudo-A Register (*IA) | 3-66 |
| Output Data Word on Channel (*OA) | 3-66 |
| Load Monitor Overlays (*OV) | 3-66 |


When you have finished these readings you may go on to the next assigned activity.

## LEARNING ACTIVITY 3-E. REFERENCE READING: COMMAND BUFFER COMMANDS

This activity describes the CMSE commands for creating, modifying, and executing command buffers.

OBJECTIVE

- You will be able to state the purpose, format, and use of each of the CMSE command buffer commands.

Read the following information in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530.


| Title | Page |
|---|---|
| Command Buffer Commands | 3-48 |
| Insert Command in Command Buffer (IN) | 3-51 |
| Delete Command in Command Buffer (DE) | 3-51 |
| Execute Command Buffer (GO) | 3-52 |
| Terminate Command Buffer (TB) | 3-52 |
| Temporarily Halt Command Buffer Sequence (SQ) | 3-52 |
| Display Comment | 3-53 |
| Send Space Command (SP) | 3-53 |
| Return Jump to Command Buffer (RJ) | 3-53 |
| Write Command Buffer to MSL Disk (*WB) | 3-54 |
| Add Command Buffer to Disk Library (*AB) | 3-54 |
| Delete Command Buffer from Disk Library (*DB) | 3-54 |


When you have finished these readings you may go on to the next assigned activity.

## LEARNING ACTIVITY 3-F. PLATO LESSON: UTILITY, LIBRARY, AND COMMAND BUFFER COMMANDS

During this lesson, you learn how to use the CMSE utility, library, and command buffer commands.

OBJECTIVES

- You will be able to state the purpose, format, and use of each of the CMSE utility commands and disk library commands.
- You will be able to state the purpose, format, and use of each of the CMSE command buffer commands.

To complete this activity, sign on to the PLATO terminal, and go to the assignment page for learning activity 3-F. Take the PLATO lesson as directed.

## LEARNING ACTIVITY 3-G. REFERENCE READING: PROGRAM CONTROL COMMANDS

During this activity, you learn about the commands that alter parameter bits which control program execution.

OBJECTIVE

- You will be able to state the purpose, format, and use of each of the CMSE program control commands.

The program control commands set and clear parameter bits in PP memory. These bits control execution of PP tests and diagnostics, and the effect of each parameter bit depends upon the test currently executing.

These program control commands are described on page 3-67 of the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530. Read the information on pages 3-67 and 3-68 before you continue with this activity.

PP memory location 5 contains the address of the word in which the parameter bits are to be set.

For example, if location 5 contains address $122_8$, then entering the program control SST sets bit $2^0$ of the word at location $122_8$.

If bit $2^{15}$ in location $122_8$ is set, however, then CMSE ignores the commands, and leaves the command in the keyboard buffer as a job command that is passed to any PP requesting keyboard/display data.

PP programs now have a common set of commands to control their parameter bit settings, even though the action of the command on the individual program is totally dependent on the program itself.

This completes this activity. You may now review any of the previous activities in module 3, or take the module 3 test.

## POST TEST

When you have completed the learning activities assigned for module 3, sign on to the PLATO terminal and take the module 3 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

Depending on the results of the test, you will be told either to review some of the activities in this module or to go on to module 4.

2134G

# MODULE 4
# COMMAND BUFFERS

During this module, you learn how to create, edit, and execute command buffers.

## POST TEST

To start this module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLATO Learning Management (PLM) will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 4-A | Reference Reading: Creating Command Buffers. This activity describes how to create a command buffer from either the system console or a card reader, and how to edit an existing command buffer. | 4-3 |
| _____ | _____ | 4-B | PLATO Lesson: Creating and Executing Command Buffers. This lesson describes how to display, interpret, edit, and execute an existing CMSE command buffer, and how to create a new command buffer. | 4-4 |

## LEARNING ACTIVITY 4-A. REFERENCE READING: CREATING COMMAND BUFFERS

During this activity, you learn how to create and edit command buffers.

OBJECTIVE

- You will be able to create command buffers from either a card reader or the console keyboard and to modify an existing command buffers.

Previous learning activities described the CMSE commands for displaying, executing, and editing command buffers.

In this activity, you will learn procedures for creating a new command buffer and for modifying an existing buffer.

Read the topics listed below in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530.


| Title | Page |
|---|---|
| Creating a Command Buffer | 4-1 |
| Creating a Command Buffer with a Card Deck | 4-1 |
| Creating a Command Buffer at the Keyboard | 4-2 |
| Adding Comments to a Command Buffer | 4-2 |
| Command Buffer Modification | 4-3 |


When you have finished the preceding reading assignments you may go on to the next assigned activity.

## LEARNING ACTIVITY 4-B. PLATO LESSON: CREATING AND EXECUTING COMMAND BUFFERS

This lesson describes how to create, edit, and execute command buffers.

OBJECTIVE

- You will be able to create command buffers from either a card reader or the console keyboard and to modify an existing command buffer.

During this lesson, you are asked to create a command buffer. Use the following list of CMSE commands to create your command buffer.

- CF
- CX,0
- CX,1
- DP,5
- CP,5,PMT2
- PP,5
- RU,5,100
- TB

To complete this activity, sign on to the PLATO terminal and go to the assignment page for learning activity 4-B. Take the PLATO lesson as directed.

When you have completed this lesson, you may take the module 4 test.

## POST TEST

When you have completed the learning activities assigned for module 4, sign on to the PLATO terminal and take the module 4 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

Depending on the results of the test, you will be told either to review some of the activities in this module or to go on to module 5.

1796G

# MODULE 5
# MSL UTILITY PROGRAMS

Utility programs provide capabilities not covered by standard CMSE commands or tests. During this module, you learn about the various utility programs included on the MSL 150 tape, including TDX, HIVS TDX, CAU, DMP, HDP, and RTD.

## PRETEST

To start this module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLATO Learning Management (PLM) will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 5-A | Reference Reading: TDX Utility. This activity describes the TDX utility program. | 5-3 |
| _____ | _____ | 5-B | PLATO Lesson: TDX/HIVS TDX Operation. This activity describes the operating procedures for the tape-to-disk utility program. | 5-4 |
| _____ | _____ | 5-C | Reference Reading: CAU Utility. This activity describes CAU operating procedures, options, and commands. | 5-5 |
| _____ | _____ | 5-D | Reference Reading: DMP Utility. This activity describes the DMP utility program. | 5-6 |

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 5-E | Reference Reading: HDP Utility. This activity describes the HDP utility program. | 5-7 |
| _____ | _____ | 5-F | Reference Reading: RTD Utility. This activity describes the RTD utility program. | 5-8 |
| _____ | _____ | 5-G | PLATO Lesson: RTD Operations. This activity describes RTD operating procedures, options, and commands. | 5-9 |

## LEARNING ACTIVITY 5-A. REFERENCE READING: TDX UTILITY

During this activity you learn about the standalone tape-to-disk utility programs TDX and HIVS TDX.

OBJECTIVE

- You will be able to state the purpose of TDX and HIVS TDX, list their hardware requirements, and identify the procedures for building a disk library using TDX and HIVS TDX.

Read the topics listed below in the MSL 150 Off-Line Maintenance Software Library Reference Manual, publication number 60456530.

| Title | Page |
|---|---|
| Tape-To-Disk Utility (TDX) | 6-33 through 6-~~48~~ 50 |
| Hardware Initialization and Verification Software Tape-To-Disk Utility (HIVS TDX) | 6-~~49~~ 51 through 6-52 |

While reading the text, pay particular attention to the Informative Messages on pages 6-45, and the error messages on pages 6-46 through 6-48, and 6-~~53~~ 51 and 6-52.

When you have finished your reading assignments, you may go on to the next activity.

## LEARNING ACTIVITY 5-B. PLATO LESSON: TDX/HIVS TDX OPERATION

This activity simulates TDX operation.

OBJECTIVE

- You will be able to state the purpose of TDX and HIVS TDX, list their hardware requirements, and identify the procedures for building a disk library using TDX and HIVS TDX.

To complete this activity, sign on to the PLATO terminal and go to the assignment page for learning activity 5-B. Take the PLATO lesson as directed.

## LEARNING ACTIVITY 5-C. REFERENCE READING: CAU UTILITY

This activity describes the CTI/MSL disk area utility (CAU).

OBJECTIVE

- You will be able to state the purpose of CAU, list its hardware and software requirements, and identify its operating procedures.

CAU is a stand-alone common test initialization (CTI) utility which is used to store data in the CTI/MSL disk storage area (CDA).

The MSL 150 Reference Manual, publication number 60456530, describes CAU characteristics and operating procedures.

Read the section titled, CTI/MSL Disk Area Utility (CAU), on pages 6-3 through 6-10.

After completing this reading assignment, you may go on to the next assigned activity.

## LEARNING ACTIVITY 5-D. REFERENCE READING: DMP UTILITY

This activity describes the dayfile and memory dump (DMP) utility program.

OBJECTIVE

- You will be able to state the purpose of DMP, list its hardware and software requirements, and identify its operating procedures.

DMP is a CMSE utility which allows dumping of PP memories, CM and EM to a line printer without the need to deadstart the hexadecimal dump-to-printer (HDP) routine.

Read the section in the MSL 150 Reference Manual, publication number 60456530 titled, Dayfile and Memory Dump Utility (DMP), on pages 6-11 and 6-12.

When you have completed this reading assignment, you may go on to the next assigned activity.

## LEARNING ACTIVITY 5-E. REFERENCE READING: HDP UTILITY

This activity describes the hexadecimal dump-to-printer (HDP) utility program.

OBJECTIVE

- You will be able to state the purpose of HDP, list its hardware and software requirements, and identify its operating procedures.

HDP is a stand-alone utility program that enables deadstart dumps on PP memories, CM, register files, IOU registers, CM registers, CP registers control store, and physical environment monitor registers.

Read the section in the MSL 150 Reference Manual, publication number 60456530 titled, Hexadecimal Dump-to-Printer Utility (HDP), pages 6-53 through 6-57.

When you have finished this reading assignment you may go on to the next assigned activity.

## LEARNING ACTIVITY 5-F. REFERENCE READING: RTD UTILITY

This activity describes the remote terminal driver (RTD) utility program.

OBJECTIVE

- You will be able to state the purpose of RTD, list its hardware and software requirements, and identify its operating procedures.

RTD is a CMSE utility program that provides an interface between CMSE and the customer engineer (CE) located at a remote terminal.

Read the section of the MSL 150 Reference Manual, publication number 60456530 titled, Remote Terminal Driver (RTD), on pages 6-59 through 6-67.

When you have finished this reading assignment, you may go on to the next assigned activity.

## LEARNING ACTIVITY 5-G. PLATO LESSON: RTD OPERATION

This lesson simulates RTD operation.

OBJECTIVE

- You will be able to state the purpose of RTD, list its hardware and software requirements, and identify its operating procedures.

To complete this activity, sign on to the PLATO terminal and go to the assignment page for learning activity 5-G. Take the PLATO lesson as directed.

When you have completed this lesson, you may take the module 5 test.

## POST TEST

When you have completed the learning activities assigned for module 5, sign on to the PLATO terminal and take the module 5 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

Depending on the results of the test, you will be told either to review some of the activities in this module or to go on to module 6.

# MODULE 6
# ON-LINE EDIT UTILITY

During this module you learn the purpose and operating procedures for the On-Line Edit Utility program.

## PRETEST

To start this module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLATO Learning Management (PLM) will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 6-A | Reference Reading: Edit Utility. This activity describes the edit utility and its operating procedures. | 6-3 |
| _____ | _____ | 6-B | Exercise: Edit Utility Review. This activity reinforces what you learned in learning activity 5-A. | 6-4 |

## LEARNING ACTIVITY 6-A. REFERENCE READING: EDIT UTILITY

During this activity, you learn about the EDIT utility, and how to use it to prepare an MSL binary tape in preparation for building an MSL disk.

OBJECTIVE

- You will be able to state the purpose of the EDIT utility, list each of the EDIT directives, and state the meaning of each EDIT message.

EDIT is an on-line utility program that, unlike the utilities covered in module 5, runs under control of the operating system. It only operates on the MSL binary release tape, selecting those items on the tape suitable for the site configuration.

The MSL 150 Reference Manual, publication number 60456530, describes the EDIT utility and its operating procedures.

Read the section titled, On-Line Edit Utility (EDIT), on pages 6-19 through 6-31 before continuing with this activity.

From the reading assignment, you should recall the following points.

1. EDIT can be used to edit and shorten a binary release tape or to make octal patches to a program on an edited tape.

2. EDIT is a FORTRAN program that executes under control of the operating system.

3. Before attempting to run EDIT, a set of EDIT control cards must be prepared which define the operation to be performed, the system configuration, device assignments and, in the case of a patch to an existing program, the test name, location, current value, and new values to be inserted in the program.

As EDIT runs under the operating system, refer to the appropriate OS reference manuals, and check with the customer personnel before attempting to load and execute the program.

When you have finished reading the assigned text and the additional information above, you may go on to the next assigned activity.

## LEARNING ACTIVITY 6-B. EXERCISE: EDIT UTILITY REVIEW

This activity reinforces what you learned about the EDIT utility program in learning activity 6-A.

OBJECTIVE

- You will be able to state the purpose of the EDIT utility, list each of the EDIT directives, and state the meaning of each EDIT message.

Directions: Answer the following questions or complete the following statements by writing the most appropriate word or words in each blank.

1. Which of the following operations can be performed with EDIT? _____

   a. Copy binary tape to disk.
   b. Make octal patches on an edited tape.
   c. Make octal patches on an MSL disk.
   d. Edit and shorten an MSL binary tape.

2. Write the EDIT directive as it would appear in the control card to define the following system configuration:

   a. Model 835 CPU (single CPU)
   b. CM size = 262K
   c. $20_{10}$ PPs SYSTEM 835,262K,1,24

3. Write the EDIT directive as it would appear in the EQUIP control card to define the following system configuration:

   a. 885 disk equipment
   b. 405 card reader
   c. 580 line printer with programmable format control.
   d. 67X tape drive
   e. Buffer controllers on PPs EQUIP,885,405,P580,67X,BCP

4. Write the EDIT directive to define the following disk library device.

   a. type = 885
   b. channel = 03
   c. equipment = 00
   d. unit = 00
   e. starting cylinder = 00

Disk, 885, 03, 00, 00, 00

## ANSWERS FOR LEARNING ACTIVITY 6-B

1. b, d

2. SYSTEM, 835, 262K, 1, 24

3. EQUIP, 885, 405, P580, 67X, BCP

4. DISK, 885, 03, 00, 00, 00

## POST TEST

When tou have completed the learning activities assigned for module 6, sign on to the PLATO terminal and take the module 6 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

Depending on the results of the test, you will be told either to review some of the activities in this module or to go on to module 7.

1772G

# MODULE 7
# DEMOT

This module introduces the diagnostic executive monitor of off-line testing (DEMOT), describes how to load DEMOT, and shows the various displays available under DEMOT.

## PRETEST

To start the module, sign on to the PLATO terminal and read the objectives. If you feel that you might be able to meet some of the objectives, take the module test. After evaluating the results of your test, PLM will assign the learning activities that relate to the objectives you did not meet. If you do not wish to take the test first, ask for an assignment.

## LEARNING ACTIVITIES

In the Assigned column, put a check mark by each activity assigned to you by PLM. Then proceed through your assigned activities. Check off each activity as you complete it. You may choose to do all the activities or do some of the activities more than once.

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 7-A | Reference Reading: DEMOT Introduction. This activity describes the purpose of DEMOT, its components, and capabilities. | 7-3 |
| _____ | _____ | 7-B | PLATO Lesson: DEMOT Displays. This activity describes how to load DEMOT, and the purpose of each of the DEMOT displays. | 7-4 |
| _____ | _____ | 7-C | Text Reading: Operating Procedures. This activity describes the purpose of each executive directive. | 7-5 |

| Assigned | Completed | Activity | Description | Page |
|---|---|---|---|---|
| _____ | _____ | 7-D | PLATO Lesson: DEMOT Operation. This activity provides practice in loading DEMOT, and running a peripheral diagnostic. | 7-21 |

## LEARNING ACTIVITY 7-A. REFERENCE READING: DEMOT INTRODUCTION

During this activity, you learn the purpose of DEMOT, its components, and capabilities.

OBJECTIVE

- You will be able to state the purpose of DEMOT and identify its structure and organization.

DEMOT is an off-line executive monitor system. The name is an acronym derived from Diagnostic Executive Monitor Off-Line Testing. DEMOT is used to control programs that test peripheral devices on Control Data CYBER 170, Series 700 and Series 800 computer systems. DEMOT executes off-line in the minimum and maximum configurations that are supported by common maintenance software executive (CMSE).

Read the following information in your MSL 150 Reference Manual, publication number 60456530.

| Title | Page |
|---|---|
| DEMOT Executive (DEMOT) | 5-11 |
| Program Description | 5-11 |
| Executive | 5-11 through 5-13 |
| Compiler | 5-13 |
| PP Driver | 5-14 |
| PP Product Overlay | 5-14 |
| Non-I/O Commands | 5-14 |
| Low-Level I/O Commands | 5-14 |
| High-Level I/O Commands | 5-14 |
| Structure and Organization | 5-15 |
| Module | 5-15 |
| Registers and Buffers | 5-16, 5-17 |
| Data Organization | 5-17, 5-18 |

When you have finished this reading assignment, you may go on to the next assigned activity.

## LEARNING ACTIVITY 7-B. PLATO LESSON: DEMOT DISPLAYS

During this activity, you learn how to load DEMOT and the purpose of the DEMOT displays.

OBJECTIVE

- You will be able to state the purpose of each DEMOT display and enter the commands required to bring up each display.

To complete this activity, sign on to the PLATO terminal and go to the assignment page for learning activity 7-B. Take the PLATO lesson as directed.

## LEARNING ACTIVITY 7-C. TEXT READING: OPERATING PROCEDURES

During this activity, you learn the purpose of each of the DEMOT executive directives.

OBJECTIVE

- You will be able to enter the DEMOT executive directives to assign devices, set parameters, and start execution of a DEMOT type diagnostic.

OPERATIONAL PROCEDURE

The DEMOT executive and driver are called and placed into execution by a series of CMSE commands. These commands can be entered at the keyboard or through the card reader.

To execute the command buffer, the operator enters:

GO,name

name Name of the command buffer.

EXECUTIVE DIRECTIVES

Table 7-1 provides a summary of DEMOT executive directives. These directives are read by the executive and acted upon immediately, if legal, at the time of input. If illegal, an error messge is written to the currently selected output files.

All executive directives may be preceded by a period, if desired, to distinguish them from CMSE commands.

TABLE 7-1. EXECUTIVE DIRECTIVES SUMMARY

| Directive | Description |
|---|---|
| ASSIGN or A | Assigns a device to DEMOT for testing. |
| CLRDS | Clears switch options within the DS register. |
| CLRSW | Clears switch options within DEMOT. |
| COMPILE or C | Calls the compiler to compile a module. |
| DEVICES | Displays list of device codes supported. |
| DEMOT | Displays DEMOT executive directives. |
| DEMOT C | Sets compiler to active or inactive. |
| DEMOT S = xxxxxx | Sets name of file to be used for SYS read. |
| DROP | Stops the module; idles EXEC/driver PPs. |
| GO or G | Resumes exccution of a stopped module. |
| I or D | Increments or decrements to next display page. |
| LINE or L | Sets line number to receive next source. |
| LOAD | Loads module from library. |
| LOADCM | Loads specified modules into central memory. |
| LOADCM S=xxxxxx | Loads scratch file for SYS read into central memory. |
| MOVE or M | Opens up or eliminates source code lines. |
| PARAM or P | Inputs parameters to pass to PP registers. |
| PICTURE | Forms picture of DEMOT display on output. |
| PPU | Displays PP messages/plots. |
| RUN or R | Starts PP executing selected modules. |
| SCRATCH | Change record accessed by SYSRD/SYSREW/SYSRD. |

TABLE 7-1. EXECUTIVE DIRECTIVES SUMMARY (Cont)

| Directive | Description |
|---|---|
| SETDS | Sets switch options within the DS register. |
| SETSW | Sets switch options with DEMOT. |
| SOURCE | Displays source code of current module. |
| STOP or S | Stops execution of a module in the PP. |

ASSIGN DIRECTIVE

The ASSIGN directive assigns a device to DEMOT for testing. It uses one of the following formats.

```
ASSIGN CH=aa,EQ=bb,UN=cc,DC=dd,SN=eeeeee,AL=ff.
  or
A,CH=aa,EQ=bb,UN=cc,DC=dd,SN=eeeeee,AL=ff.
```

| | |
|---|---|
| aa | Channel (default=0). |
| bb | Equipment number (default=0). |
| cc | Unit number (default=0). |
| dd | Device code (default=0). |
| eeeeeee | Media serial number (default=0). |
| ff | Access level (default=0). |

For MSS, the following additional parameters are used.

```
ASSIGN...,MST=gg, MSA=hh, MSTPH-ii, CSU=jj
```

| | |
|---|---|
| gg | MST address (default=0). |
| hh | MSA address (default=0). |
| ii | MST physical address (default=0). |
| jj | CSU address (default=0). |

For the loosely coupled network (LCN), the following additional parameters are used.

```
ASSIGN...,LTA=kkk,TCU=jj,AC=mmmm,BFZ=nn
```

| | |
|---|---|
| kkk | Logical Trunk Control Unit (TCU) address, used if DC=301 (octal). |
| jj | Octal number of enabled TCU (1=TCU 3, 2=TCU 2, 4=TCU 1, 10=TCU 0). Used if DC=301 (octal). |
| mmmm | Access code of assigned NAD, used if DC=301 (octal). |
| nn | Octal value representing controlware buffer size (1=516 bytes, 2=2064 bytes, 4=4128 bytes). Used if DC=301 (octal). |

The ASSIGN directive provides the required data to access a device for testing. There are several formats of the ASSIGN directive to provide the required data to gain this access. Access levels 0 through 4 indicate that a high-level language and product overlay is to be used. If the controller has controlware memory, its contents cannot be changed.

Access level 5 indicates that only the assigned device may have its controlware destroyed. Access level 5 is used for loosely coupled network (LCN) network access device (NAD) tests.

Access level 6 indicates that both the assigned and accessed devices may have their controlware destroyed. Access level 6 is for LCN NAD local and remote testing.

To gain access to the low-level I/O commands, access level 10, 20, or 21 must be specified.

Table 7-2 defines the access level codes and the level of testing that is allowed at each level.

TABLE 7-2. ACCESS LEVEL CODES

| Level Octal | RMS | Non-RMS |
|---|---|---|
| 0 | Illegal (if specified on assign). | Dedicated unit, high-level I/O. |
| 1 | Read preallocated area only, high-level I/O. | Illegal. |
| 2 | Read any normal data area only, high-level I/O. | Illegal. |
| 3 | Read any normal data area, write preallocated area, high-level I/O. | Illegal. |
| 4 | Read/write any normal data area, high-level I/O dedicated unit. | Illegal. |
| 5 | Illegal. | LCN NAD dedicated. Code in NAD assigned may be rewritten. |
| 6 | Illegal. | LCN NAD local and remote dedicated. Code may be rewritten in both. |
| 10 | Dedicated controller and all units. High- and low-level I/O. May destroy controlware. | |
| 20 | Dedicated controller, all units and channel. All devices must be off and not in use on the channel since master clears may be performed. High- and low-level I/O. Controlware may be destroyed. | |
| 21 | Same as level 20 plus I/O channel is left in a hung state if a channel hang occurs. | |

Prior to allowing any module to be executed, DEMOT verifies that the module requested was actually written for the device code that is currently assigned. A module may support as many as 10 unique device codes

CLRDS DIRECTIVE

CLRDS aa,bb,...,ff

The CLRDS directive sets switches logically off in the DS register. The parameters aa through ff may be any of the following:

| Switch | Default | Bit | Description |
|---|---|---|---|
| SE | On | 0 | Stop on error. |
| RM | Off | 1 | Repeat module. |
| RC | Off | 2 | Repeat condition. |
| BC | Off | 3 | Beginning of condition stop |
| BM | Off | 4 | Beginning of module stop. |
| BT | Off | 5 | Beginning of test stop. |
| TE | Off | 6 | End of test stop. |
| CE | Off | 7 | Condition end stop. |
| ME | Off | 8 | Module end stop. |
| S1 | Off | 9 | Programmable switch 1. |
| RT | Off | 10 | Repeat test. |
| S2 | Off | 11 | Programmable switch 2. |

CLRSW DIRECTIVE

The CLRSW directive clears switch options within DEMOT. It uses the following format.

CLRSW,aa,bb...,ff

aa through ff Switch options to clear as follows:

| Switch | Default | Description |
|---|---|---|
| RC | Off | Repeat condition. |
| SE | On | Stop on error. |
| RM | Off | Repeat module. |
| PL | Off | Print log (off stops all new output). |
| DL | Off | Dayfile log (off stops all new dayfile messages. |
| RT | Off | Repeat test. |
| KL | Off | System display. |

COMPILE DIRECTIVE

The COMPILE directive calls the compiler to compile the source code buffer. It uses one of the following formats.

```
COMPILE a,b
  or
C a,b
```

a,b Compiler options as follows:

| Option | Description |
|---|---|
| LIST | Causes the source and binary of the module compiled to be written to the output file if the print log (PL) switch is on. |
| SOURCE | Causes the source code to be carried with the module binary when it is saved on the library after being compiled. |

DEMOT DIRECTIVE

The DEMOT directive displays the executive directives (refer to figure 7-1). It uses the following format.

```
DEMOT
```

## DEMOT C DIRECTIVE

The DEMOT C directive sets the compiler to active or inactive status. It uses the following format.

DEMOT C= a

a Status of compiler:

| Code | Status |
|---|---|
| A | Active |
| I | Inactive |

| Directive | Comments |
|---|---|
| ASSIGN | ASSIGN DEVICE FOR DEMOT USE *ASSIGN CH=AA, EQ=BB, UN=CC, DC=DD, SN=EEEEEE,AL=FF* |
| CLRDS | CLEAR DS SWITCHES *CLRDS SE,RT,RM,RC* |
| CLRSW | CLEAR SWITCHES *CLRSW SE,RT,DL,RM,PL,KL,RC* |
| COMPILE | COMPILE SOURCE BUFFER *COMPILE,SOURCE,LIST* |
| DEVICES | DISPLAY DEVICE CODES *DEVICES* |
| DROP | DROP DEMOT PPUS *DROP* |
| GO | RESUME EXECUTION OF MODULE THAT WAS STOPPED *G* |
| LINE | SET LINE FOR NEXT ENTRY *LINE* |
| LOAD | LOAD MODULE *LOAD MNENN* |
| LOADCM | LOAD MODULES TO CM *LOADCM MNE (00,01,02,03,03A)* OR *LOADCM S=SYSFIL* |
| DEMOT | DISPLAY DEMOT EXECUTIVE DIRECTIVES *DEMOT C=A/I* OR CHANGE SYS FILE NAME *DEMOT S=SYSFIL* |
| MOVE | *MOVE AAA UP BBB LINES* |
| MOVE | *MOVE AAA DOWN BBB LINES* |
| PARAM | CHANGES PARAMETERS *PARAM P0=1234,P1=1234,P9=1234, LL=1234 LL=LINE LIMIT |
| PICTURE | PRINT DISPLAY ON OUTPUT FILE *PICTURE=TYPE* |
| PPU | DISPLAY PPU MESSAGES/PLOTS *PPU* |
| RUN | RUN MODULE(S) *RUN MNE (10,02,03,04,10,07)* |
| SCRATCH | CHANGE SYSRD RECORD NAME *SCRATCH=lfn* |
| SETDS | SET DS SWITCHES *SETDS,RC,RM,SE,TE,CE,RT |
| SETSW | SET SWITCHES *SETSW,SE,RC,RM,DL,PL,KL,RT* |
| SOURCE | DISPLAY SOURCE FOR MODULE *SOURCE* |
| STOP | STOP PPU EXECUTION *STOP* |
| I | INCREMENT PAGE ON DISPLAY *I* |
| D | DECREMENT PAGE ON DISPLAY *D* |
| .X-X | ENTER SOURCE LINE FROM KEYBOARD *.SOURCE* |
| LINE=000 | PPU STATUS = STOPPED MODULE =xxx00 |

Figure 7-1. Sample Display for DEMOT Directive

DEMOT S DIRECTIVE

The DEMOT S directives changes the name of the scratch file used with the SYS command. The default name is SCRATCH. This command must be entered before MLD is initiated. The DEMOT S directive uses the following format.

```
DEMOT S=xxxxxx
```

xxxxxx Name of the scratch file.

DEVICES DIRECTIVE

The DEVICES directive displays device codes for use on the ASSIGN directive (refer to figure 7-2). It uses the following format.

```
DEVICES
```

Codes for Devices

```
01=841 DISK                          02=7054/844-2 DISK
03=7054/844-4 DISK                   04=7154/844-2 DISK
05=7154/7155/844-4 DISK              06=819 DISK
07=7155/885 DISK                     10=FSC-100 MBYTE
11=FCS-200MBYTE                      12=FSC-317 MBYTE
20=405 CARD READER                   21=415 CARD PUNCH
22=512 LINE PRINTER                  23=580-12 LINE PRINTER
24=580-16 LINE PRINTER               25=580-20 LINE PRINTER
26=580-12 PFC LINE PRINTER           27=580-16 PFC LINE PRINTER
30=580-20 PFC LINE PRINTER           31-37 RESERVED
40=60x 7 TRK TAPE                    41=65x 7 TRK TAPE
42=66x 7 TRK TAPE                    43=RESERVED
44=67x 7 TRK TAPE                    45=FSC 7 TRK TAPE
46-47 RESERVED                       51=65x 9 TRK TAPE
50=60x 9 TRK TAPE                    53=RESERVED
52=66x 9 TRK TAPE                    55=67x GCR 9 TRK TAPE
54=67x 9 TRK TAPE                    57 - RESERVED
56 - RESERVED                        61=6676 MUX
60=6671 MUX                          63=2550-100 EMULATING 6676
62=2550-100 EMULATING 6671           65=7077-1 LCC
64=2550                              67=6683 COUPLER
66=6673 DATA SET                     71=ECS COUPLER
70=DDP                               100=MSS-MST
72-77 RESERVED                       102-277 RESERVED
101=MSS-CSU                          301=LCN REMOTE NAD
300=LCN LOCAL NAD                    7700-7777 QSE
302-7677 RESERVED

LINE=000   PP STATUS = STOPPED   MODULE = xxx00
```

Figure 7-2. Sample Display for DEVICES Directive

## DROP DIRECTIVE

The DROP directive stops the PP driver, if running, and drops DEMOT. It uses the following format.

```
DROP
```

## GO DIRECTIVE

The GO directive resumes execution of the PP driver that has stopped. It uses one of the following formats.

```
GO
  or
G
```

## I OR D DIRECTIVE

The I or D directive increments or decrements, respectively, to the next display page. It uses one of the following formats.

```
I = a
  or
D = a
```

a Advances or moves back from the current page being displayed on the system, the number of pages specified by a.

## LINE DIRECTIVE

The LINE directive sets the data input pointer to a specific source line number. The next source code input then is sent to this line number. It uses one of the following formats.

```
LINE a
  or
L a
```

a Line number of 0 to $167_8$.

LOAD DIRECTIVE

The LOAD directive loads a module from the CMSE file to the module buffer and displays the first page of the source, if available. It uses the following format.

LOAD aaannn

| | |
|---|---|
| aaa | Module test series. |
| nnn | Module number. |

LOADCM DIRECTIVE

The LOADCM directive loads specified modules into central memory when running DEMOT from a tape system. Processing of this directive terminates with an error message if a specified module cannot be found on the library. The LOADCM directive uses the following format.

LOADCM aaa(bbb,cc,ddd)

| | |
|---|---|
| aaa | Module test series. |
| bbb through ddd | Two- or three-character module or sub-module numbers. |

LOADCM S DIRECTIVE

The LOADCM S directive loads specified scratch files into central memory, after the modules have been loaded. It uses the following format.

LOADCM S=xxxxxx

| | |
|---|---|
| xxxxxx | Name of the scratch file to be used by the SYS read. |

MOVE DIRECTIVE

The MOVE directive moves source lines up or down. It is used to make space for modifications to a module or to eliminate unwanted lines. A move up overwrites the data currently existing in the lines being moved to. It uses one of the following formats.

```
MOVE a UP b
  or
MOVE a DOWN b

M a UP b
  or
M a DOWN b

MOVE a + b
  or
MOVE a - b

M a + b
  or
M a - b
```

a Line number to start the move.

b Number of lines to move.

PARAM DIRECTIVE

The PARAM directive passes program parameters to the PP driver when a module is started into execution. The display is changed to the PARAM display (refer to figure 7-3). The PARAM directive uses one of the following formats.

```
PARAM aa=xxxx, aa=xxxx,...
  or
P aa=xxxx, aa=xxxx,...
```

aa Indicates one of the following:

| Code | Description |
|---|---|
| P0 to P9 | PP driver register number. |
| LL | The number of lines allowed (line limit) before DEMOT turns print output off. (LL set to 0 = infinity.) |

xxxx Octal value to be placed into the specified PP driver register.

```
                    PARAMETERS IN OCTAL

P0=0000   P1=0000   P2=0000   P3=0000   P4=0000   P5=0000
P6=0000   P7=0000   P8=0000   P9=0000             LL=1750
-------------------------------------------------------
                    SWITCH STATUS

ON  - (SE) STOP ON ERROR          OFF - (RM) REPEAT MODULE
OFF - (RT) REPEAT TEST
OFF - (PL) PRINT LOG              OFF - (DL) DAYFILE LOG
OFF - (KL) K/L DISPLAY            OFF - (RC) REPEAT CONDITION
ON  - (SE) STOP ON ERROR          OFF - (BT) BEGINNING OF TEST
OFF - (RT) REPEAT TEST            OFF - (TE) TEST END
OFF - (RM) REPEAT MODULE          OFF - (CE) CONDITION END
OFF - (RC) REPEAT CONDITION       OFF - (ME) MODULE END
OFF - (BC) BEGINNING OF COND      OFF - (S1) PROG SWITCH 1
OFF - (BM) BEGINNING OF MODULE    OFF - (S2) PROG SWITCH 2

-------------------------------------------------------
                    ASSIGN VALUES

    DC=0000   CH=0000   EQ=0000   UN=0000   AL=0000
    SN=000000

         ADDITIONAL ASSIGN VALUES FOR MSS ONLY

  CSU=0000   MSA=0000   MST=0000   MSTPH=0000

         ADDITIONAL ASSIGN VALUES FOR LCN ONLY

  LTA=0000   TCU=0000   AC=0000   BFZ=0000

LINE=000   PPU STATUS = STOPPED   MODULE =xxx00
```

Figure 7-3. Sample Display for PARAM Directive with Default Values

## PICTURE DIRECTIVE

The PICTURE directive is used to print a picture of a specified display. It uses the following format.

PICTURE type

type  Specifies display to be printed:

| Code | Prints |
|---|---|
| DEMOT | DEMOT directives display. |
| DEVICES | Devices display. |
| PARAM | Parameter display. |
| PPU | PP display. |
| SOURCE | List one page of source data. To obtain a complete source data listing, use the COMPILE directive with the LIST option (*COMPILE,LIST,SOURCE*) |
| Blank | Current display. |

PPU DIRECTIVE

The PPU directive displays module-generated information. It uses the following format.

```
PPU
```

RUN DIRECTIVE

The RUN directive starts PP execution. It uses one of the following formats.

```
RUN sss (aa,bb,cc,dd,ee,ff,gg,...)
  or
R sss (aa,bb,cc,dd,ee,ff,gg,...)
```

| | |
|---|---|
| sss | A three-alphanumeric-character test series name. |
| aa,bb, and so on | Decimal module numbers within the specified series to be executed in the order defined. (If only the test series is specified, all modules in the series are executed in numerical order up to the first END command.) |

Leading zeros are necessary when specifying module numbers. The RUN directive specifies the test series of modules that are to be executed, the specific modules in this series to execute, and the

order in which to execute them. If more than 60 characters are needed to specify module numbers, do not include the right parenthesis character until the last line of the directive. As many as 100 modules may be specified on one RUN directive.

Examples:

1. Run specific modules regardless of END/EXIT statements:

```
RUN TST (00,01,02,03,04,05,06,07....29,30,31,32,33,34)
```

Runs modules 00 through 34 in order specified.

```
RUN TST (00,01,00,01)
```

Runs modules 00,01,00,01.

2. Run a test series:

```
RUN TST
```
Runs test series starting with 00.

```
RUN TST20
```
Runs test series starting with 20.

```
RUN TST30
```
Runs test series starting with 30.

NOTE

A false CMSE error message ERR-NOT ON LIBRARY, may be encountered if a break exists in the numerical series. Execution is not affected.

3. Run single module:

```
RUN TST (00)        Runs module 00.

RUN TST (01)        Runs module 01.

RUN
```
Runs currently loaded module.

SCRATCH Directive

SCRATCH=lfn

The SCRATCH directive changes the record name accessed by SYSRD/ SYSREW/SYSWR to lfn, where lfn is from 1 to 6 characters.

SETDS DIRECTIVE

SETDS aa,bb,...,ff

The SETDS directive sets switches logically on in the DS register. The parameters aa through ff may be any of the following:

| Default | Switch | Bit | Description |
|---|---|---|---|
| On | SE | 0 | Stop on error. |
| Off | RM | 1 | Repeat module. |
| Off | RC | 2 | Repeat condition. |
| Off | BC | 3 | Beginning of condition stop. |
| Off | BM | 4 | Beginning of module stop. |
| Off | BT | 5 | Beginning of test stop. |
| Off | TE | 6 | End of test stop. |
| Off | CE | 7 | Condition end stop. |
| Off | ME | 8 | Module end stop. |
| Off | S1 | 9 | Programmable switch 1. |
| Off | RT | 10 | Repeat test. |
| Off | S2 | 11 | Programmable switch 2. |

SETSW DIRECTIVE

The SETSW directive turns on switch options and sends them to the PP driver. It uses the following format.

SETSW aa,bb,cc,...

aa,bb,cc, and so on — Switch options to be set as follows:

| Switch | Default | Description |
|---|---|---|
| RC | Off | Repeat condition. |
| SE | On | Stop on error. |
| RM | Off | Repeat module. |
| PL | Off | Print log (on resumes new output). |
| DL | Off | Dayfile log (on resumes new dayfile messages). |
| RT | Off | Repeat test. |
| KL | Off | System display used for input. |

NOTE

PL and DL must remain OFF when running DEMOT from tape.

SOURCE DIRECTIVE

The SOURCE directive displays a page of the source code buffer (figure 7-4). The I directive can be used to advance the page. The LINE=0 directive can be used to reset the page to the beginning. It uses the following format.

SOURCE

```
000=     MODULE TEST01, 3000 (20, 21,22)
001=01   FORMAT SAMPLE MODULE TO DISPLAY MAGS ON LINE=*OCT
002=02   B2=0
003=03   B1=0
004=4    MSG 1 (B1) TO LINE B1
005=     GOTO 4 WHILE (B1+1.LT.50B)
006=     GOTO 3 WHILE (B2+1.LT.100B)
007=     END 2
010=
011=
012=
013=
014=
015=
016=
017=
.
.
.
045=
046=
047=


 LINE=010    PPU STATUS=    STOPPED    MODULE   = xxx00
```

Figure 7-4. Sample Display for SOURCE Directive

STOP DIRECTIVE

The STOP directive flags the PP driver to stop the current module being executed at the next logical breakpoint. It uses one of the following formats:

```
STOP
  or
S
```

DEMOT contains several executive and computer messages to describe error and status conditions during program execution.

These are listed on pages 5-33 through 5-35 in the MSL 150 Reference Manual. You may read these messages now to become familiar with their format and contents.

This completes this text reading. You may review the lesson, or go on to the next assigned activity.

## LEARNING ACTIVITY 7-D. PLATO LESSON: DEMOT OPERATION

During this activity, you will gain practice in loading DEMOT, setting parameters, assigning devices, and running a peripheral diagnostic.

OBJECTIVE

- You will be able to enter the DEMOT executive directives to assign devices, set parameters, and start execution of a DEMOT type diagnostic.

To complete this activity, sign on to the PLATO terminal and go to the assignment page for learning activity 7-D. Take the PLATO lesson as directed.

## POST TEST

When you have completed the learning activities assigned for module 7, sign on to the PLATO terminal and take the module 7 test.

You may use your student manual and your reference manuals during the test. Be sure to take them with you to the PLATO terminal.

When you have mastered all the objectives for this module, you will have completed all the modules for this MSL 150/CMSE Operation course.

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# APPENDIX A
# USING INDIVIDUALIZED INSTRUCTION

If this is your first experience with individualized instruction, you probably have a few questions. The information that follows will help you understand the nature of individualized instruction.

## WHAT IS INDIVIDUALIZED INSTRUCTION?

Individualized instruction is a teaching method that is oriented toward the individual rather than the group. Individualized instruction--

- Determines what skills you possess that pertain to the topic of instruction.
- Determines what skills you must acquire.
- Allows you to acquire these skills at your own pace by studying a variety of learning activities.

Individualized instruction is structured around a student manual that guides you through the course and is also a learning resource. The student manual is divided into modules.

Each module contains information that will help you meet the objectives of that module. The information within the module is presented in learning activities.

## MAY I WORK WITH OTHER STUDENTS?

Yes, if two or more of you are taking the course at the same time, it may be beneficial for you to do some of the learning activities together. Whether you work alone or with others depends on your needs.

## HOW DO I PROCEED THROUGH THE COURSE?

You begin the course by signing on to the PLATO terminal. See appendix B for detailed instructions for signing on. You may want to take the pretest or you may ask for a full assignment that teaches all of the objectives of the first module. If you take the pretest, PLATO learning management (PLM) will evaluate the results of the test and assign the learning activities that are keyed to the objectives you did not master. Then, study the

assigned learning activities and retake the test. If you are successful, proceed to the next module and repeat the process until course completion. If not, study the assigned learning activities and retake the test until you master all the module objectives.

See figure A-1 for a flowchart illustrating your progress through the course.

## HOW DO MODULES, COURSES, AND CURRICULA RELATE TO EACH OTHER?

The structure of the Engineering Services Training Program has three parts (see figure A-2):

- Module. A module is made up of learning activities. It contains objectives and test questions. A module teaches specific training tasks. For example, a module could cover electrical/mechanical adjustments.

- Course. A course is made up of modules. A course covers a single subject, for example, a course on the oscilloscope or magnetic tape unit.

- Curriculum. A curriculum is made up of courses. It covers a broad area of knowledge, for example, an entire subsystem. A curriculum may contain courses that range in complexity from introductory to advanced.

## WHAT KIND OF RESOURCES ARE USED IN INDIVIDUALIZED INSTRUCTION?

Individualized learning activities use the following resources and combinations of those resources to present information.

- Text Reading. This resource presents information via the student manual and provides simplified explanations, drawings, and examples.

- Reference Reading. This resource directs you to read designated pages in a specified reference manual.

- Exercises. This resource presents information via the student manual. It uses a question/answer presentation. An exercise may be used to present new material or it may determine your comprehension of previously presented material.

- Programmed Text. This resource is a student manual text reading that presents information and asks for immediate feedback to determine your comprehension.

- Laboratory. This resource gives you actual hands-on experience with computer equipment.

- PLATO Assisted Learning. This resource presents information via the PLATO terminal.

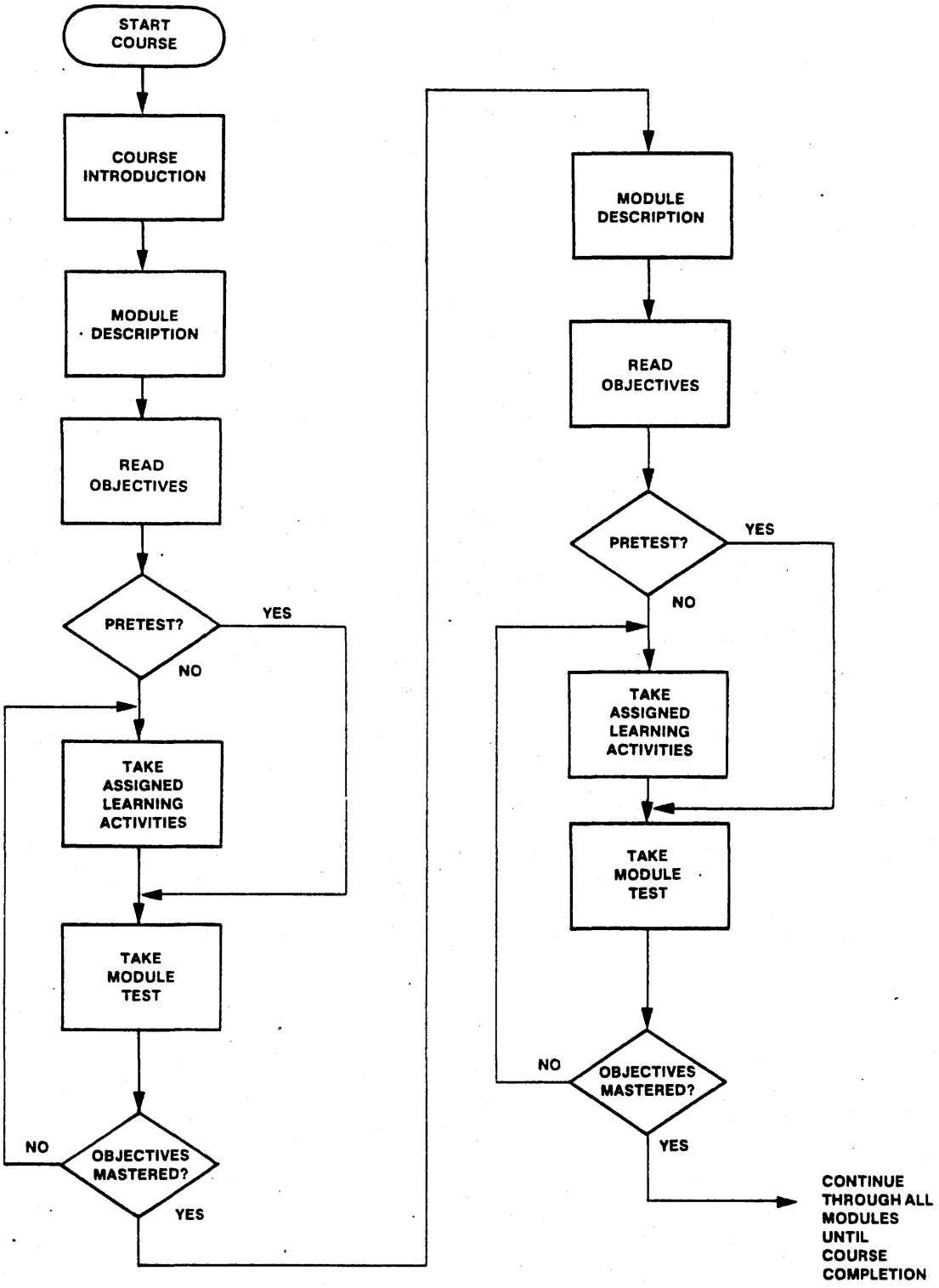


Figure A-1. Student Progress

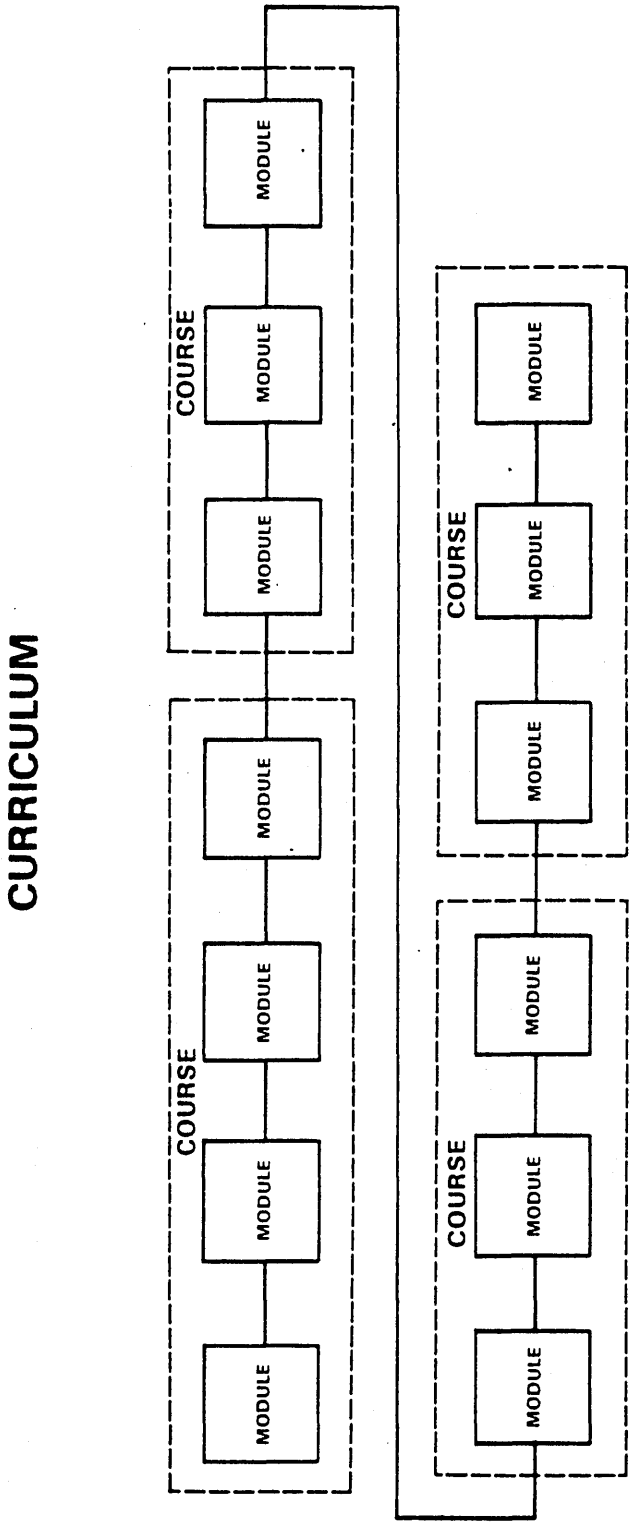


Figure A-2. Program Structure

- Audiotape. This resource presents an audio message via an audiotape machine.
- Microfiche. This resource uses a microfiche viewer and microfiche film to illustrate information.
- Videotape. This resource uses a videotape playback unit and videotape to present information.

You may proceed from one learning activity to another at your own pace. The learning activites are not long, but it is important that you take the time to understand the material before you go on to the next activity.

Each learning activity is coded with a number and a letter. The number stands for the module and the letter represents the order in which the learning activity is presented. The first learning activity of the first module is Learning Activity 1-A. The second activity is 1-B, and so on.

## HOW DO I TAKE A TEST?

All testing is managed by PLATO learning management (PLM). PLM performs three important functions:

- Administers all tests.
- Assigns learning activities based on the results of the tests.
- Retains your student records for all courses you take within a curriculum.

PLM has two modes of testing, on-line and off-line. On-line testing requires that you sign on to a PLATO terminal to take the test. When you complete the test, PLM will assign learning activities based on the results of your test.

On-line testing is preferred because it saves time and enables you to proceed through your training without any delays.

Off-line testing is the more traditional method. Your administrator will give you a copy of the test and an answer sheet. Do not write on the test; record all your answers on the answer sheet. Return your test to the administrator, who will grade it and enter the results into the PLM system.

## WHAT IS THE INDIVIDUALIZED INSTRUCTION TESTING PHILOSOPHY?

A test is a device that determines whether you have met the objectives of the course (module). It determines if you have acquired the skills that the course is designed to teach.

The number of times you take a test or your score on the test is not as important as the information you gain from the test results. The results tell you what areas you need to study.

Do not be alarmed if you need to take a test more than once. It is not your scores that count, it is your ability to perform your job that is important to you, Engineering Services' customers, and Control Data.

## WHO ARE THE PERSONNEL INVOLVED IN INDIVIDUALIZED INSTRUCTION?

### Regional Education Manager (REM)

The REM manages the training program for the region/country. He coordinates and administrates training activities to ensure that training needs are identified and fulfilled.

### Regional Training Coordinator (RTC)

The RTC works with the education center manager to provide assistance as required; for example, he orders training materials, processes enrollments/confirmations, etc.

### Education Center Manager (ECM)

The ECM administrates and coordinates training activities to ensure training delivery. For example, he provides a technical training advisor and identifies training materials requirements for the RTC. This individual may be a resource center manager, regional education manager, skill center manager or education center manager.

### Education Training Coordinator (ETC)

The ETC manages the PLATO learning management (PLM) system. He provides the student with a student sign-on and PLM entries, and he works with the education center manager to solve PLM related problems.

Technical Advisor (TA)

The TA deals directly with the student. He monitors activities and provides guidance and assistance as required. A TA may be an engineer-in-charge, regional technical support instructor or a customer engineer with technical expertise.

Subject Matter Expert (SME)

The SME provides technical assistance for training problems that cannot be resolved by the technical advisor.

Learning Center Administrator (LCA)

The LCA works directly with the student to ensure smooth progression through the course.

# APPENDIX B
# PLATO SIGN-ON PROCEDURES

In order to begin the course you must first sign on to the PLATO system. Depending on where your terminal is located, you may first have to dial up the PLATO computer in order to establish communication between the computer and your terminal. If your terminal is on a direct connection, this is not necessary, and steps 2 and 3 can be skipped.

1. Turn power on.

*2. Dial the number of the PLATO system using the data phone. When the system answers, you will hear a tone. The next step must be performed within three seconds after you hear the tone.

*3. Lift exclusion button (usually located on the telephone cradle). Place the receiver on the table or in front of the cradle. Do not hang up.

NOTE

Some data phones require that you lift the exclusion button to dial, and hang up when the tone is heard.

4. Press the STOP key on the PLATO terminal keyboard.

5. Press the NEXT key on the PLATO keyboard. This causes the welcome to PLATO page to be displayed (figure B-1).

6. Enter your name exactly as you are registered in this course. Normally this will be your last name, followed by a space, and your first initial, with no capital letters (for example, smith j, as shown in figure B-2).

   If you make a mistake, you can erase it by pressing the ERASE key on the right side of the keyboard.

7. Press the NEXT key. You will then be asked to enter the name of your PLATO group . Enter the name of the PLATO group in which you are registered. Once again, the exact spelling is required.

---

*Dial-up system only.

Appendix B

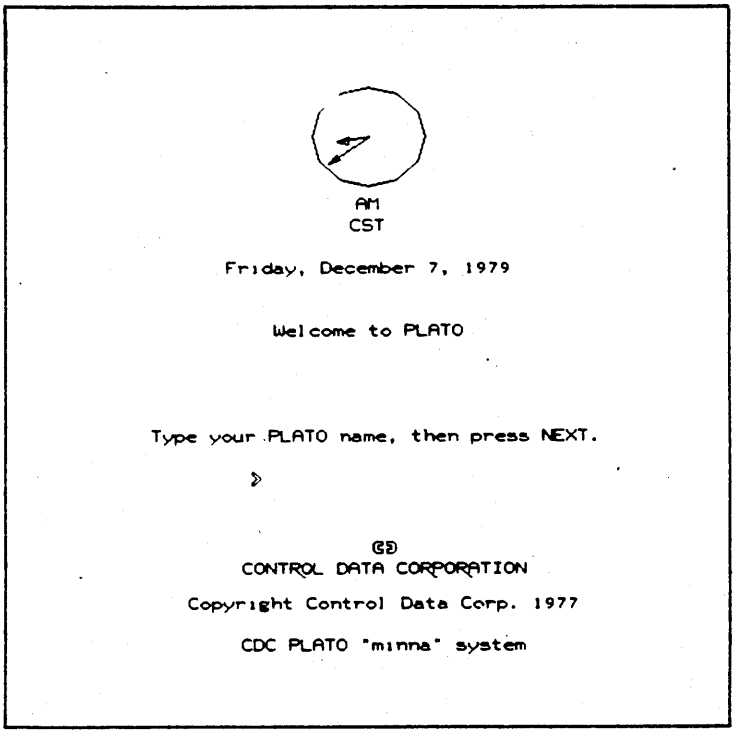


Figure B-1. Welcome to PLATO

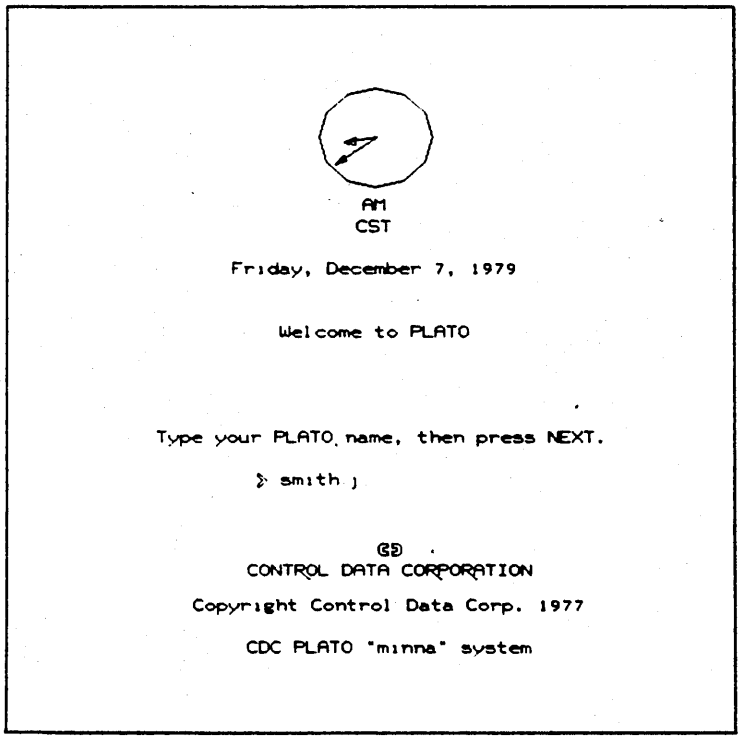


Figure B-2. Repeat

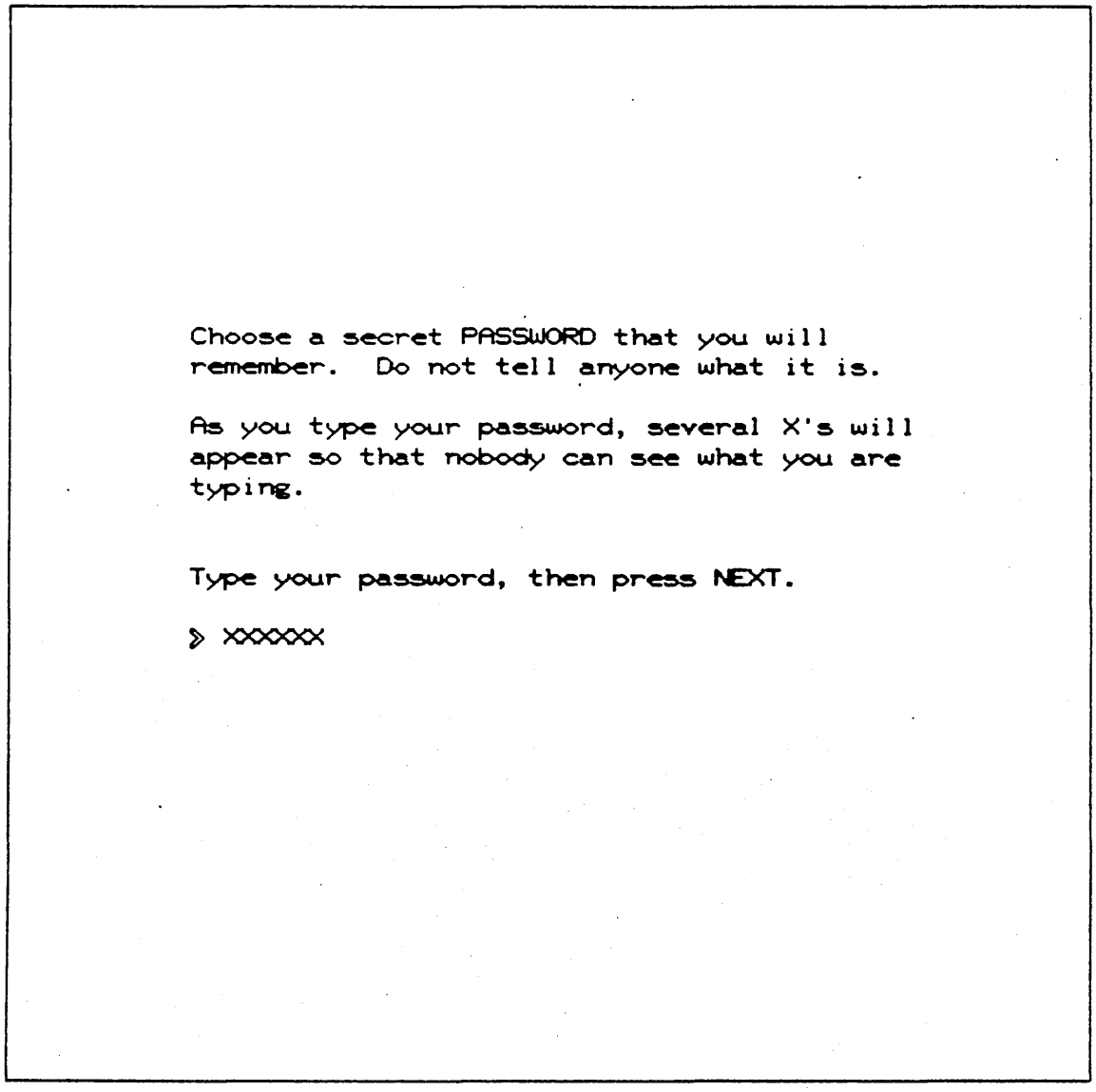
Choose a secret PASSWORD that you will remember. Do not tell anyone what it is.
As you type your password, several X's will appear so that nobody can see what you are typing.
Type your password, then press NEXT.
» XXXXXX

Figure B-3. Password

8. Hold down the SHIFT key and press the STOP key. You will then be asked to enter your password (figure B-3). Your password can be anything you choose, but it must be something that you can easily remember, such as a name, phone number, employee number, etc. Do not forget the password you have selected. It will become your key for gaining access to your lessons.

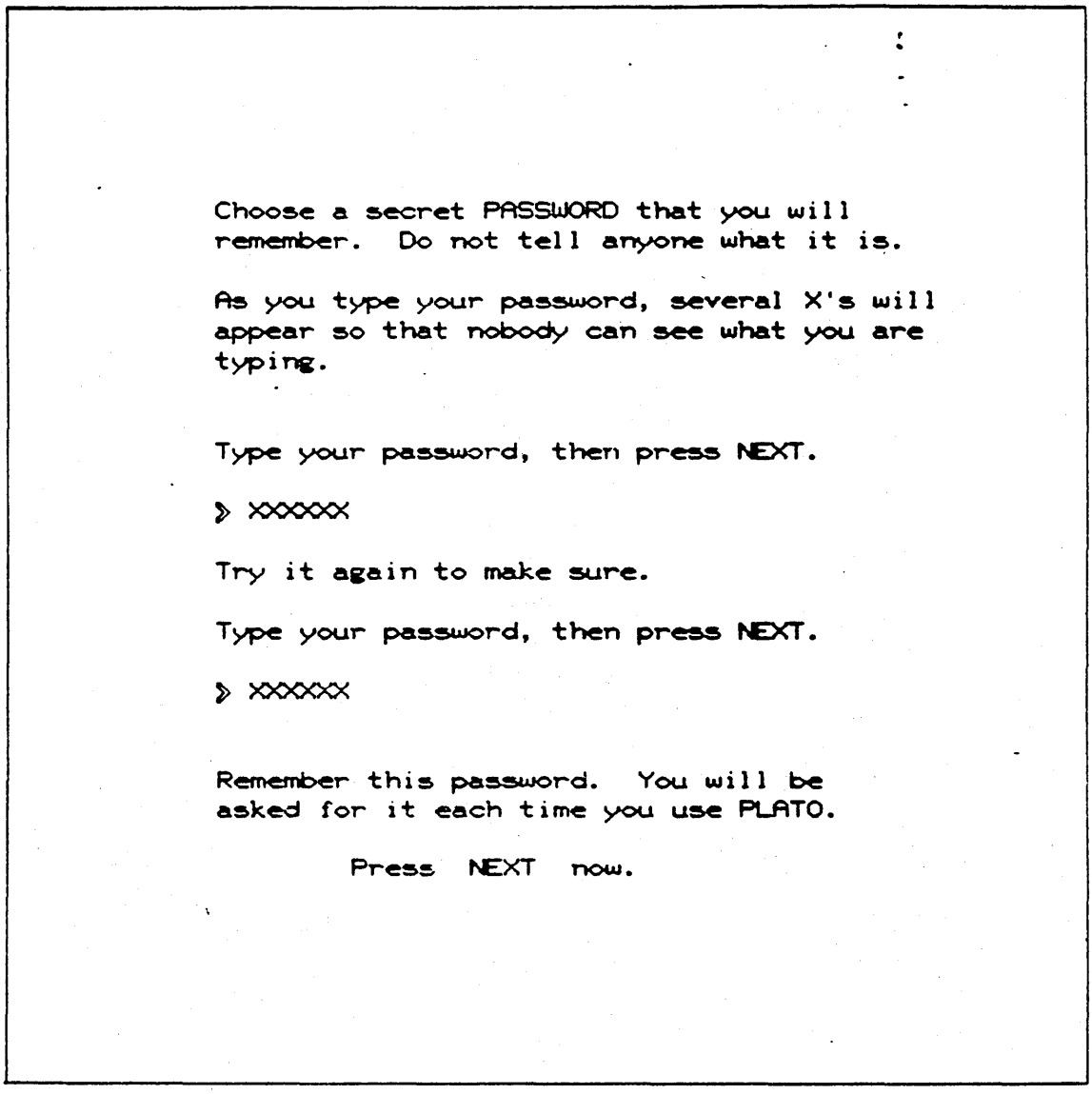
Choose a secret PASSWORD that you will remember. Do not tell anyone what it is.
As you type your password, several X's will appear so that nobody can see what you are typing.
Type your password, then press NEXT.
> XXXXXX
Try it again to make sure.
Type your password, then press NEXT.
> XXXXXX
Remember this password. You will be asked for it each time you use PLATO.
Press NEXT now.

Figure B-4. Password Repeat

9. Press the NEXT key. If this is the first time you have signed on to this course, you will be asked to enter your password again (figure B-4). Enter it again, just as you did before. From this point on you will be required to enter your password only once when you sign on.

10. Press NEXT. You are now signed on to the system.

# APPENDIX C
# USING MICROFICHE

## INTRODUCTION

This appendix provides the basics of selecting, loading, and viewing microfiche on a Micron 780 Microfiche Desk Reader or a similar reader. (See the Microfiche Handbook, available from Information Services, STP109, for more information.)

The portable microfiche desk reader may also be used since it has the same capabilities as the Micron 780.

Consult the operator's manual for specific information on the readers.

## SELECTION

Select the proper microfiche by consulting the microfiche header, which contains the title of the contents and the microfiche reference number (figure C-1).

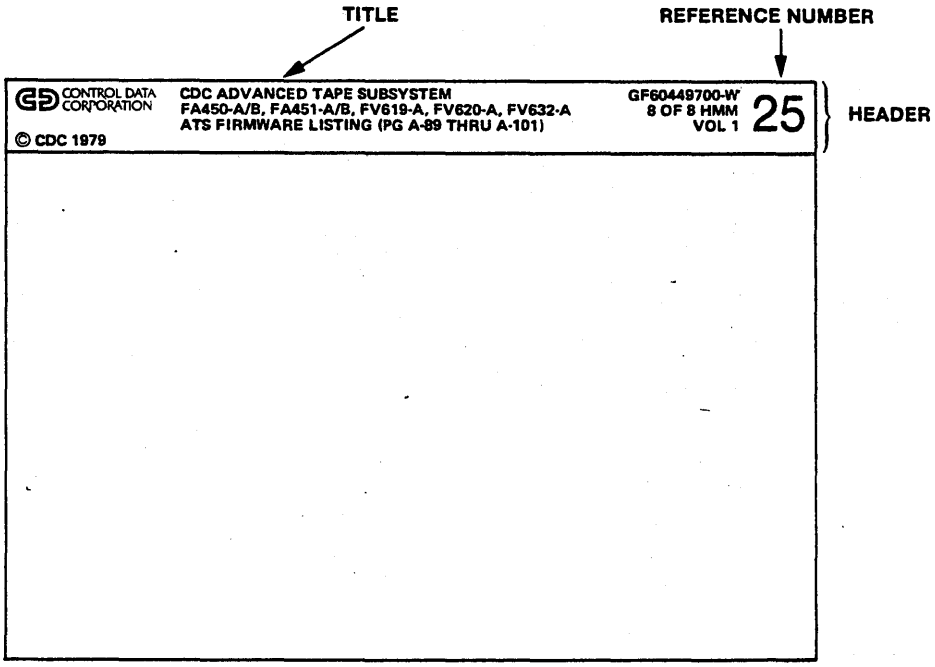


Figure C-1. Microfiche

(Manual Title)
Appendix C

LOADING

To load the Micron 780 Desk Reader or a similar desk reader, perform the following procedure (figure C-2).

1. Turn on the microfiche desk reader by pushing in on the side of the LOW-OFF-HIGH switch that indicates a low light intensity setting.

2. Pull the carriage assembly toward you until the glass covers flip up.

3. Hold the microfiche by the header with the printed information facing up (figure C-3).

4. Position the microfiche toward the upper right corner of either glass.

5. Push the carriage assembly back and position it so that a full picture with a index grid coordinate number is visible on the screen.

6. Select the proper index grid. Each microfiche desk reader is equipped with two index grids, a 24X index grid for 24X microfiche and a 42X index grid for 42X microfiche; most documentation is on 24X microfiche (figure C-4).

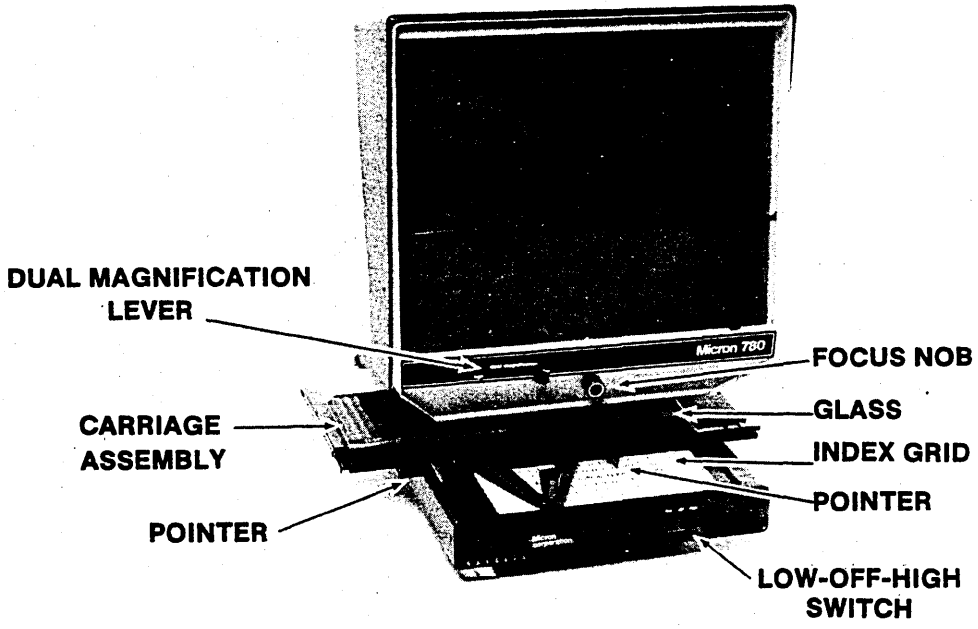


Figure C-2. Microfiche Desk Reader

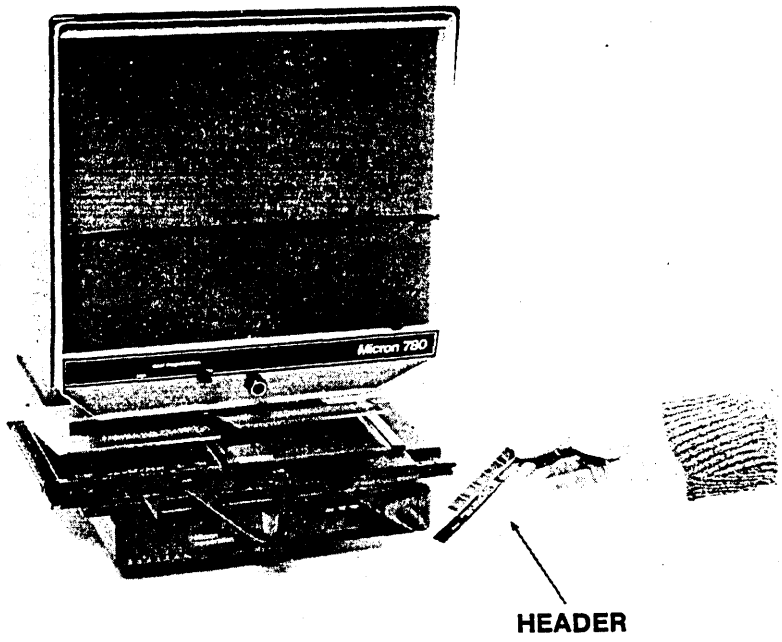


Figure C-3. Inserting Microfiche into Desk Reader

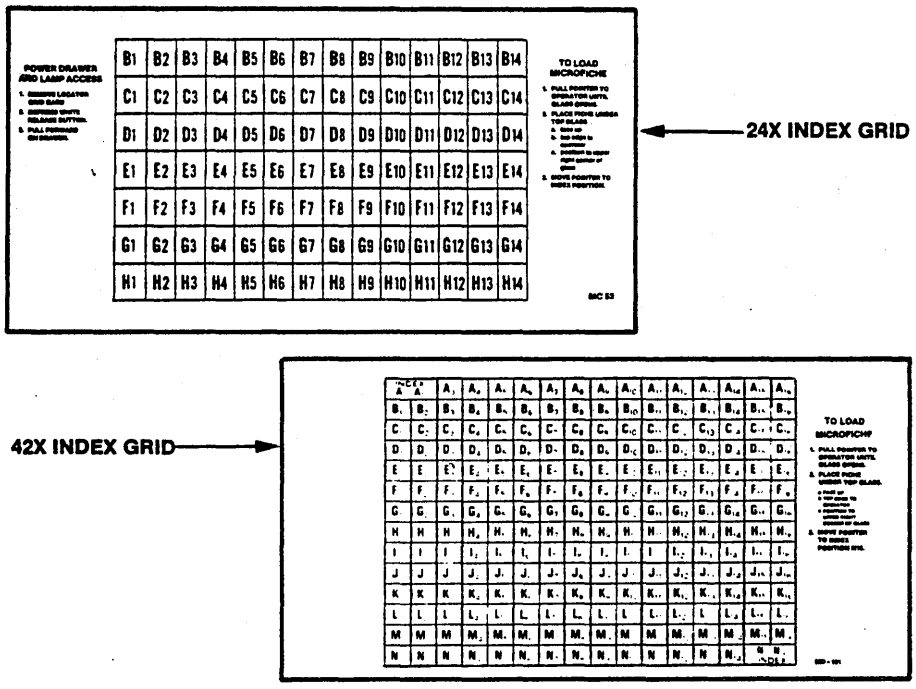


Figure C-4. 24X and 42X Index Grids

a. The 24X microfiche has a 3/8-inch header, and the 24X index grid is divided into 14 horizontal boxes.
b. The 42X microfiche has a 1/2-inch header, and the 42X index grid is divided into 16 horizontal boxes.

7. Place the proper index grid so that the carriage pointer is centered over the index grid coordinate number that appears on the screen.

VIEWING

When viewing a logic diagram with a index grid coordinate number of B1, position the carriage pointer between B1 and B2 on the index grid. Adjust the carriage to obtain a full screen picture. Student manuals and audiotapes may call the coordinates B1/B2 on the index grid. B1/B2 indicates that the carriage pointer should be positioned between B1 and B2 on the index grid (figure C-5).

Other pages of technical manual can be viewed by placing the carriage pointer in the center of the index grid coordinate number (figure C-6).

Screen Quadrants

The desk reader screen is divided into four quadrants to reference any area of the screen (figure C-7). It has a transparent horizontal yellow line for the horizontal axis; you may need to add the vertical axis. Transparent map tape, clear tape, or grease pencil work well as the vertical axis.

Magnification

A dual lense microfiche reader, such as the Micron 780, can magnify any area of a 24X microfiche by using the high (42X) lense in the following procedure.

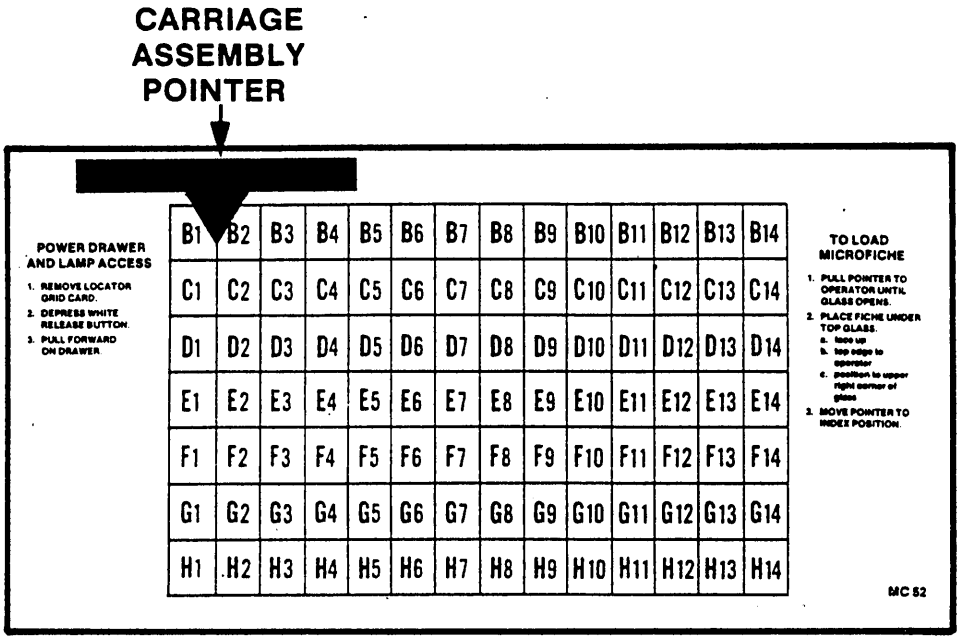
CARRIAGE ASSEMBLY POINTER
POWER DRAWER AND LAMP ACCESS
1. REMOVE LOCATOR GRID CARD.
2. DEPRESS WHITE RELEASE BUTTON.
3. PULL FORWARD ON DRAWER.
B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14
G1 G2 G3 G4 G5 G6 G7 G8 G9 G10 G11 G12 G13 G14
H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12 H13 H14
TO LOAD MICROFICHE
1. PULL POINTER TO OPERATOR UNTIL GLASS OPENS.
2. PLACE FICHE UNDER TOP GLASS.
3. MOVE POINTER TO INDEX POSITION.
MC 52

Figure C-5. Carriage Assembly Pointer Position for Technical Manuals

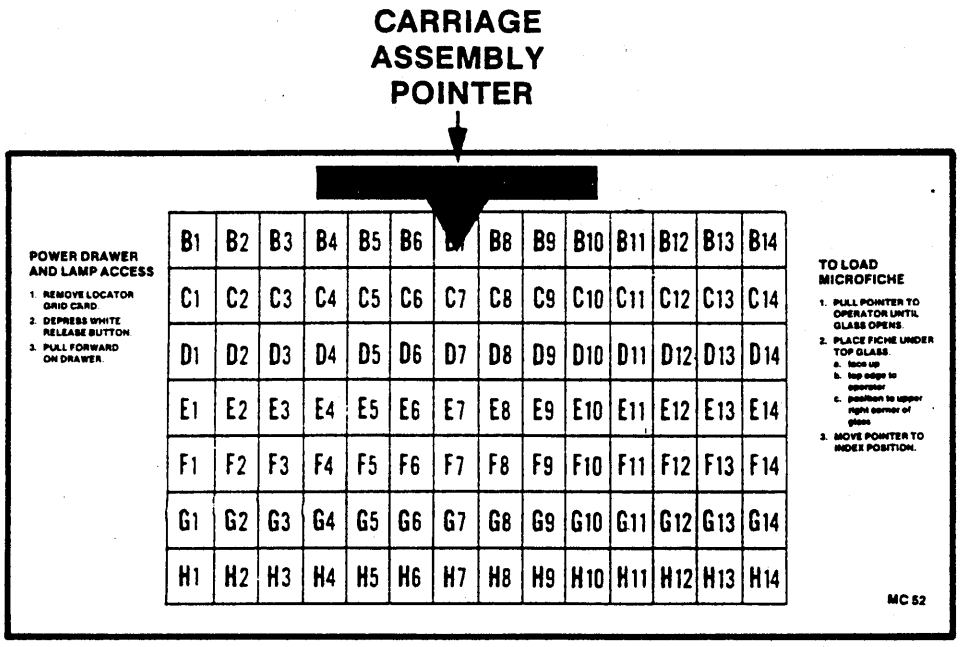
CARRIAGE ASSEMBLY POINTER
POWER DRAWER AND LAMP ACCESS
1. REMOVE LOCATOR GRID CARD.
2. DEPRESS WHITE RELEASE BUTTON.
3. PULL FORWARD ON DRAWER.
B1 B2 B3 B4 B5 B6 B7 B8 B9 B10 B11 B12 B13 B14
C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 C11 C12 C13 C14
D1 D2 D3 D4 D5 D6 D7 D8 D9 D10 D11 D12 D13 D14
E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E12 E13 E14
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11 F12 F13 F14
G1 G2 G3 G4 G5 G6 G7 G8 G9 G10 G11 G12 G13 G14
H1 H2 H3 H4 H5 H6 H7 H8 H9 H10 H11 H12 H13 H14
TO LOAD MICROFICHE
1. PULL POINTER TO OPERATOR UNTIL GLASS OPENS.
2. PLACE FICHE UNDER TOP GLASS.
3. MOVE POINTER TO INDEX POSITION.
MC 52

Figure C-6. Carriage Assembly Pointer Position for Logic Diagrams

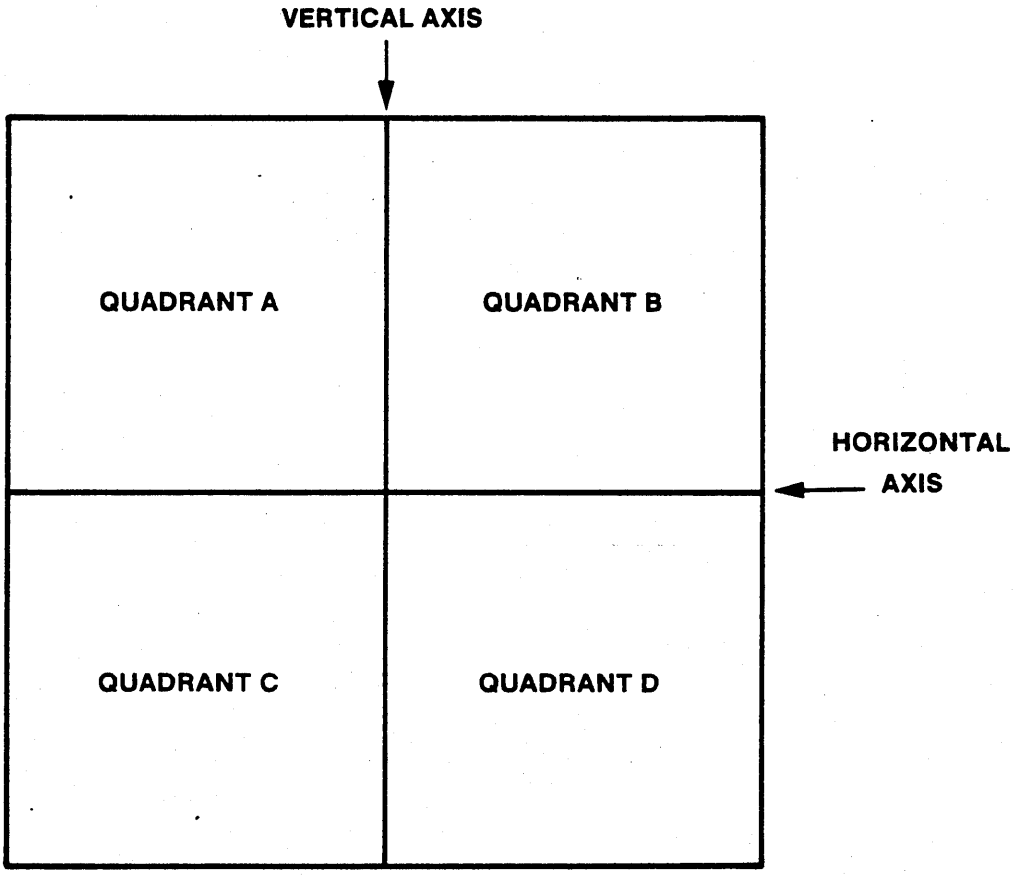


Figure C-7. Screen Quandrants

1. Position the area that you wish to magnify in the center of the screen using the carriage assembly (see figure C-2 for the location of the DUAL MAGNIFICATION lever).

2. Move the DUAL MAGNIFICATION lever to HIGH.

3. Return the magnification lever to LOW before moving on to another frame.

## Light Intensity

The microfiche desk reader can deliver high or low light intensity. The Light Intensity switch is part of the LOW-OFF-HIGH switch.

The following suggestions may help reduce eye strain when using a microfiche desk reader for a long time.

- Do not watch the screen while moving to a different frame.
- Use low intensity light for low magnification and high intensity light for high magnification.
- Be sure the image on the screen is focused sharply (see figure C-2 for the location of the focus nob).
- Tilt the projector forward or backward.
- Vary the intensity of the room lighting.

Be sure to turn the viewer off whenever you are not using it. Extended exposure to light will fade the microfiche.

# COMMENT SHEET

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